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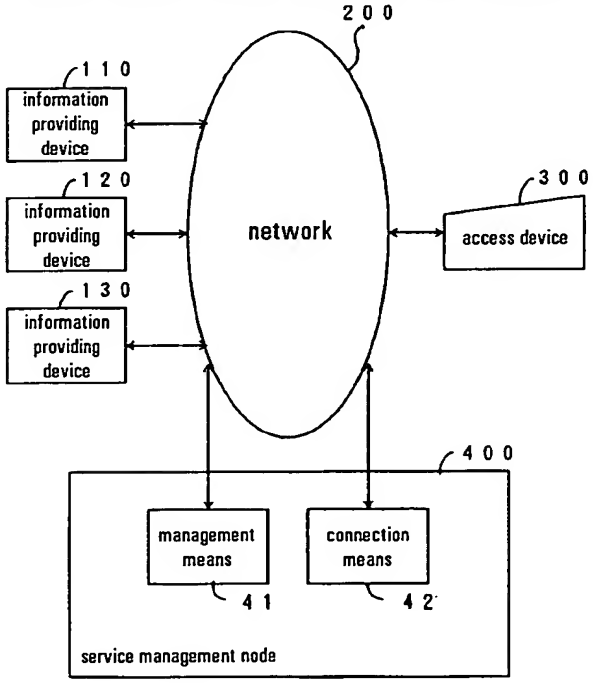
Title Service Access Method and System

Abstract

OBJECT: It is an object of the present invention to provide a service access method and system whereby a service is reliably provided when it is accessed by an access device.

CONSTITUTION: The invention comprises a service management node 400 which has a management means 41 for managing the correspondence between information providing devices 110, 120 and 130 and a service to be provided by these devices, and for managing the operating state of these information providing devices 110, 120 and 130; and which also has a connection means 42 for selecting and connecting an information providing device which is capable of providing a service when there is a service request from an access device 300.

Block diagram of principles of the invention



Claims

1. A service access method in which, when an access device uses service selection information to access a service, the service corresponding to said service selection information is provided by an information providing device; said service access method being characterised in that:

it provides a plurality of information providing devices for providing the same service;

when a service request has been issued by said access device, a service management node selects an information providing device which is capable of providing the service; and

said access device is connected to said selected information providing device.

2. The service access method according to Claim 1, wherein, when selecting said information providing device which is capable of providing the service:

said service management node manages the correspondence between said information providing devices and the service to be provided by these devices, and also manages the operating state of each information providing device; and

an information providing device capable of providing the service requested by said access device is selected on the basis of the operating state of said information providing device when access is requested by said access device.

3. The service access method according to Claim 2, wherein, when said service management node manages the operating state of each said information providing device:

it stores, in correspondence, identifiers uniquely determined for each of said information providing devices, network addresses corresponding to said identifiers, and operating state information for each information providing device at the present point in time; and

it updates the stored content when a change has occurred in the state of a said information providing device.

4. A service access system characterised in that it comprises:

an access device for using service selection information to access a service;

a plurality of information providing devices for providing the same service; and

a service management node having a management means for managing the correspondence between said information providing devices and a service to be provided by said devices, and for managing the operating state and address information of said devices; and also having a connection means for selecting and connecting an information providing device which is capable of providing a service when there is a service request from said access device.

5. The service access system according to Claim 4, wherein said management means comprises:

a state information storage means for storing identifiers uniquely assigned to said information providing devices, network addresses for each said identifier [1]*, and state information relating to said information providing devices; and

a service correspondence storage means for storing, in correspondence, the identifiers of said information providing devices and the service which said information providing devices provide.

6. The service access system according to Claim 5, wherein said connection means comprises:

an operating state detection means for detecting the operating state of said information providing devices by looking up said state information storage means;

an exclusion means for excluding, from being a candidate for connection, an information providing device which is in a state such that the service cannot be provided, said state being detected by said operating state detection means [2]; and

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* Numbers in square brackets refer to Translator's Notes appended to the translation.

a selection means for selecting an information providing device which is capable of providing the service that corresponds to the service selection information that has been issued by said access device, said selected information providing device being a candidate for connection.

7. The service access system according to Claim 6, wherein said connection means has a means which, when connecting said access device to the information providing device that has been selected by said selection means, transfers the address of said information providing device to the access device, and issues a request for connection from the access device to said information providing device.

8. The service access system according to Claim 6, wherein said connection means has a means which, when connecting said access device to the information providing device that has been selected by said selection means, issues an instruction to said information providing device to connect to said access device.

9. The service access system according to Claim 4, wherein said connection means polls said information providing devices from said management node at prescribed intervals, and connects.

Detailed Description of the Invention

Industrial field of utilisation

(1) The present invention relates to a service access method and system, and more particularly to a multimedia service access method and system for implementing services such as film appreciation and home shopping, by utilising a high-speed communication network such as an ATM network to provide bidirectional information flows encompassing still images, moving images, data and voice, and to bring the provided information into the home.*

Prior art

(2) FIG. 10 shows the constitution of a conventional multimedia service system. The illustrated system consists of information providing device 100, network 200 and access device 300. Given this constitution, access device 300 and information providing device 100 are fixedly connected via network 200.

(3) As indicated in FIG. 10, to access a conventionally implemented multimedia service, access device 300 connected to network 200 issues a service request to information providing device 100 via network 200, whereupon the service is provided by information providing device 100.

(4) When connecting access device 300 and information providing device 100, a table giving the correspondences among service names, information identifying the information providing devices for providing these services, and the network addresses of these devices, is managed either within access device 300 or within information providing device 100, or by an independent name server, and the connection target is determined on the basis of this information.

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* Numbers in round brackets at the beginning of paragraphs correspond to the paragraph numbering in the Japanese patent document.

Problems that the invention will solve

(5) However, in the conventional system described above, because the information providing device and the access device are fixedly connected via the network, if the information providing device cannot provide a service, due for example to a fault or congestion, the result is that the end customer cannot receive the service at the access device. Hence the end customer has to use another access device capable of connecting to another information providing device, and perform processing such as the re-issuing of a service request. In other words, if a service cannot be provided by the first information providing device, the end customer has to switch the connection to another device. Moreover, in circumstances where the information providing device is congested, retry processing carried out by the access device can aggravate the congestion.

(6) Hence in a conventional system, because the operating state of the information providing device is not taken into consideration, it cannot be known until a connection is attempted whether or not a given connection target is capable of providing a service. Another problem is that when it is discovered, from the result of a connection, that the information providing device in question is unable to provide the service, it is impossible to make a reasoned decision as to which of any other information providing devices should be selected as the next connection candidate.

(7) The present invention has been made in the light of the foregoing points, and it is an object of the invention to provide a service access method and system whereby a service is reliably provided when it is accessed by an access device.

Means for solving problems

(8) FIG. 1 serves to clarify the principles of the present invention. The invention is a service access method in which, when an access device uses service selection information to access a service, the service corresponding to this service selection information is provided by an information providing device. The method of the invention particularly provides a plurality of information providing devices for providing the same service; and when a service request has been issued by the access device (Step 1), a service management node selects an information providing device which is capable of providing the service (Step 2); and the access device is connected to the selected information providing device (Step 3).

(9) Moreover, according to the present invention, when selecting an information providing device which is capable of providing the service in above-mentioned Step 2, the service management node manages the correspondence between the information providing devices and the service to be provided by these devices, and also manages the operating state of each information providing device; and an information providing device capable of providing, at the present time, the service requested by the access device, is selected.

(10) Moreover, according to the present invention, when the service management node manages the operating state of each information providing device, it stores, in correspondence, identifiers uniquely determined for each information providing device, network addresses corresponding to these identifiers, and current operating state information; and it updates the stored content when a change has occurred in the state of an information providing device.

(11) FIG. 2 is a block diagram of the principles of the present invention. The service access system of the invention comprises: access device 300 for accessing a service using service selection information; a plurality of information providing devices 110, 120 and 130 for providing the same service corresponding to the service selection information from access device 300; and service management node 400. Service management node 400 itself comprises management means 41 and connection means 42. Management means 41 is adapted to manage the correspondence between information providing devices 110, 120 and 130 and a service to be provided by these devices, and also to manage the operating state and address information of these information providing devices 110, 120 and 130. Connection means 42 is adapted to select and connect an information providing device that is capable of providing a service when there is a service request from access device 300.

(12) The above-mentioned management means 41 comprises a state information storage means for storing (i) identifiers uniquely assigned to information providing devices 110, 120 and 130, (ii) network addresses for each identifier [3], and (iii) state information relating to information providing devices 110, 120 and 130; and a service correspondence storage means [for storing], in correspondence, [the identifiers of] information providing devices 110, 120 and 130, and the service which these information providing devices provide. [4]

(13) The above-mentioned connection means 42 comprises: an operating state detection means for detecting the operating state of the information providing devices; an exclusion means for excluding, from being a candidate for connection, an information providing device which is in a state such that the service cannot be provided, this state being detected by the operating state detection means; and a selection means for selecting an information providing device which is capable of providing the service that corresponds to the service selection information that has been issued by access device 300, the selected information providing device being a candidate for connection.

(14) The above-mentioned connection means 42 also comprises a means which, when connecting access device 300 to the information providing device that has been selected by the selection means, transfers the address of the information providing device to access device 300, and issues a request for connection from access device 300 to the relevant information providing device.

(15) The above-mentioned connection means 42 also comprises a means which, when connecting access device 300 to the information providing device that has been selected by the selection means, issues an instruction to the information providing device to connect to access device 300.

Working of the invention

(16) The present invention stores, for each information providing device identifier, the operating state and network address of the information providing device. It also stores the correspondence between a service and the information providing devices for providing that service. Accordingly, when a service request is issued by an access device, the operating state of information providing devices capable of providing that service is detected, whereby it is possible to select and connect to an information

providing device which is neither faulty nor congested and which is capable of providing the service that has been specified by the access device.

Embodiments

(17) Embodiments of the present invention will now be described with reference to the drawings. FIG. 3 shows the system block diagram of embodiments of the invention. In this figure, constituent elements identical to those depicted in FIG. 10 have identical referencing numerals and are not further described here. The system depicted in FIG. 3 comprises a plurality of information providing devices 110, 120 and 130 for providing the same service, access device 300, service management node 400 and network 200 for connecting these. It is assumed that access device 300 can be connected to any of the information providing devices provided that it is an information providing device that provides the same service.

(18) FIG. 4 shows the constitution of the service management node according to an embodiment of the present invention. Service management node 400 shown in this figure comprises communication unit 410, operating state detection unit 420, connection control unit 430, state storage unit 440 and service correspondence storage unit 450. Communication unit 410 is connected to network 200 and is capable of accessing any of information providing devices 110, 120 and 130 on the basis of an access request received from access device 300. Communication unit 410 also transmits, to access device 300, the address of a device among information providing devices 110, 120 and 130 that can be utilised, together with a connection instruction. Communication unit 410 also transmits, to the information providing device regarding which it has been decided that it is capable of service provision, an identifier for the access device and a designation instruction. [5]

(19) Operating state detection unit 420 acquires, at a desired time, their operating state from information providing devices 110, 120 and 130, and transfers these to state storage unit 440. Operating state detection unit 420 also searches state storage unit 440 when an access request has been issued by access device 300, and retrieves the information providing devices capable of providing the service at the current time.

(20) Connection control unit 430 determines an information providing device for providing the service that corresponds to the access request from access device 300, and performs the control required for connecting to the network address of the information providing device that has been determined. State storage unit 440 stores the names (IDs), states and network addresses of the information providing devices. FIG. 5 gives examples of the information held in the state storage unit of this embodiment of the invention. State storage unit 440 stores information relating to the information providing devices, their network addresses and their states. FIG. 5(A) shows the state of each information providing device prior to updating, while FIG. 5(B) gives an example where the state information depicted in FIG. 5(A) has been updated in accordance with state messages acquired from the information providing devices after the lapse of a certain time interval.

(21) FIG. 5(A) shows that information providing device 110 (HE1), information providing device 120 (HE2) and information providing device 130 (HE3) are all in a state such that they are capable of providing the service. The state message from each individual information providing device, this message being received via

communication unit 410, comprises at least (i) an information providing device name for uniquely identifying the information providing device that is the source of the transmitted state message, (ii) state information indicating that the service can be provided or that there is a fault or that there is congestion, etc., and (iii) information relating to the network address of the information providing device in question. Operating state detection unit 420 acquires such state messages from the information providing devices and writes them to state storage unit 440. Each information providing device also transmits, to communication unit 410 of service management node 400, a state message containing the above-mentioned elements every time its own state changes. This enables operating state detection unit 420 to update the contents of state storage unit 440 corresponding to the name of the information providing device which has transmitted a state message under these circumstances. As a result, the contents held in state storage unit 440 always show the most recent state of affairs.

(22) Service correspondence storage unit 450 holds, as a pairs of items, the names of services [6] and the names of information providing devices which provide these services. FIG. 6 gives an example of the information held in the service correspondence storage unit in an embodiment of the invention. The example given in FIG. 6 indicates that there are three information providing devices, named "HE1", "HE2" and "HE3", and that these provide a service named "Prog1".

(23) A description will now be given of the operation of the service management node having the constituent elements described above. For purposes of explanation, the service management node may be regarded as being located between the access device and the information providing devices. FIG. 7 is a sequence chart showing the operation of an embodiment of the present invention. In this sequence chart, information providing devices 110, 120 and 130 for providing a service are labelled HE1, HE2 and HE3. It should be noted that network 200 has been omitted from FIG. 7, but it is assumed that the various transfers of data are carried out via network 200.

(24) Step 101: information providing device HE2 firstly conveys, via communication unit 410 of service management node 400 to operating state detection unit 420 of the same, a state message to the effect that service is possible.

Step 102: operating state detection unit 420 of service management node 400 recognises the state message that has been input from HE2 and stores it in state storage unit 440.

(25) Step 103: next, information providing device HE3 conveys, via communication unit 410 of service management node 400 to operating state detection unit 420 of the same, a state message to the effect that service is possible.

Step 104: operating state detection unit 420 of service management node 400 recognises the state message that has been input from HE3 and stores it in state storage unit 440.

(26) Step 105: next, information providing device HE1 conveys, via communication unit 410 of service management node 400 to operating state detection unit 420 of the same, a state message to the effect that service is possible.

Step 106: operating state detection unit 420 of service management node 400 recognises the state message that has been input from HE1 and stores it in state storage unit 440.

(27) Step 107: because information providing device HE3 has developed a fault, HE3 conveys, via communication unit 410 of service management node 400 to operating state detection unit 420 of the same, a state message to the effect that a fault has occurred.

Step 108: operating state detection unit 420 of service management node 400 recognises the state message that has been input from HE3 and updates the state of HE3 in state storage unit 440 from "service possible" to "fault".

(28) Step 109: because information providing device HE2 has become congested, HE2 conveys, via communication unit 410 of service management node 400 to operating state detection unit 420 of the same, a state message to the effect that it is congested.

Step 110: operating state detection unit 420 of service management node 400 recognises the state message that has been input from HE2 and updates the state of HE2 in state storage unit 440 from "service possible" to "congested".

(29) Step 111: at this point, access device 300 makes an access request to service management node 400, requesting the address of an information providing device for providing the service "Prog1".

Step 112: connection control unit 430 of service management node 400 searches service correspondence storage unit 450 using service name "Prog1" as a key, acquires the names HE1, HE2 and HE3 indicating the information providing devices for providing the service "Prog1", and interrogates operating state detection unit 420 for state information regarding these information providing devices HE1, HE2 and HE3. Operating state detection unit 420 looks up state storage unit 440 and conveys to connection control unit 430 (i) the fact that the information providing device currently capable of providing "Prog1" is "HE1", and (ii) the address "add1" of the information providing device in question (HE1).

(30) Step 113: connection control unit 430 of service management node 400 informs access device 300 of the address acquired for information providing device HE1.

Step 114: access device 300 connects to information providing device HE1 via network 200 by issuing a service request to the address "add1" that has been acquired from service management node 400.

(31) Step 115: information providing device HE1 provides the service "Prog1" to access device 300.

Next, another embodiment of the present invention will be described. The previous embodiment presented an example where, at Step 113, the address of the information providing device which is capable of providing the service is transferred to access device 300 from service management node 400. However, the invention is not restricted to this particular exemplification and it is also feasible to connect access device 300 and the selected information providing device by means of service management node 400 requesting connection, via network 200, to the information providing device.

(32) FIG. 8 is a sequence chart showing the operation of this other embodiment of the present invention. FIG. 9 gives examples of the information that is held in the state storage unit during the operation of this other embodiment of the invention. It is assumed that information providing device HE3 informed operating state detection unit 420, before the processing described below was carried out, that a fault had occurred, and therefore that information providing device HE3 is in a state where it is unable to provide the service.

(33) Step 201: access device 300 issues a service request for "Prog1" to service management node 400.

Step 202: connection control unit 430 of service management node 400 searches service correspondence storage unit 450 using "Prog1" as a key. At this point, it acquires information providing device names HE1, HE2 and HE3. Next, connection control unit 430 interrogates operating state detection unit 420 to ascertain which of information providing devices HE1, HE2 and HE3 can currently be utilised. Operating state detection unit 420 looks up state storage unit 440 and obtains the result shown in FIG. 9(A), whereupon it selects information providing device HE1 and transfers the address of this device to connection control unit 430.

(34) Step 203: as a result, connection control unit 430 issues, via communication unit 410, information providing device HE1 with an instruction to connect to access device 300.

Step 204: however, in the meantime information providing device HE1 has become congested and therefore HE1 returns, to service management node 400, an indication that it is congested.

(35) Step 205: operating state detection unit 420 of service management node 400 updates the state of HE1 in state storage unit 440 as shown in FIG. 9(B).

Step 206: operating state detection unit 420 of service management node 400 selects HE2 as the information providing device that is currently capable of providing the service, and transfers the address of this device HE2 to connection control unit 430.

(36) Step 207: connection control unit 430 of service management node 400 issues a service connection instruction to address "add2" corresponding to device HE2.

Step 208: information providing device HE2 returns, to service management node 400, a notification to the effect that it has received the service connection instruction.

(37) Step 209: Next, information providing device HE2 provides the service to access device 300.

As a result, the end customer can be reliably provided with the service without a service request being issued many times by access device 300, and simply by a single service request being issued to the service management node.

(38) The embodiment described above gave an example in which the operating state of the information providing devices was acquired. However, in an alternative method, instead of looking up the contents of state storage unit 440, connection to an information providing device is performed by polling. It may be noted that in the foregoing embodiments, when there are a plurality of information providing devices

capable of providing the service, then a device can for example be selected in ascending address order.

(39) The present invention is not limited to the embodiments described above, and various modifications and applications are possible within the scope of the claims.

Effects of the invention

(40) As has been described above, according to the present invention, when there are a plurality of information providing devices for providing the same service, the state of the network and the operating state of the information providing devices at the point in time when a request has been received from an access device are taken into consideration, whereby an information providing device capable of providing the service can be reliably selected, and can be connected to the access device. As a result, the access device user does not incur the trouble of having to retry the connection procedure.

(41) In addition, for the network operator and the service provider, the load on the network and on access devices that accompanies retrying the connection procedure is lessened.

Brief Description of the Drawings

FIG. 1 serves to clarify the principles of the present invention.

FIG. 2 is a block diagram of the principles of the invention.

FIG. 3 shows the system block diagram of embodiments of the invention.

FIG. 4 shows the constitution of the service management node according to an embodiment of the invention.

FIG. 5 gives examples of the information held in the state storage unit of this embodiment of the invention.

FIG. 6 gives an example of the information held in the service correspondence storage unit in an embodiment of the invention.

FIG. 7 is a sequence chart showing the operation of an embodiment of the invention.

FIG. 8 is a sequence chart showing the operation of another embodiment of the invention.

FIG. 9 gives examples of the information held in the state storage unit during the operation of this other embodiment of the invention.

FIG. 10 shows the constitution of a conventional multimedia service system.

Description of referencing numerals

41□□□□□□□□□□□□ management means
42□□□□□□□□□□□□ connection means
110, 120, 130□□□□ information providing devices
200□□□□□□□□□□□ network
300□□□□□□□□□□□ access device
400□□□□□□□□□□□ service management node
410□□□□□□□□□□□ communication unit
420□□□□□□□□□□□ operating state detection unit
430□□□□□□□□□□□ connection control unit
440□□□□□□□□□□□ state storage unit
450□□□□□□□□□□□ service correspondence storage unit

FIG. 1

Clarification of principles of the invention

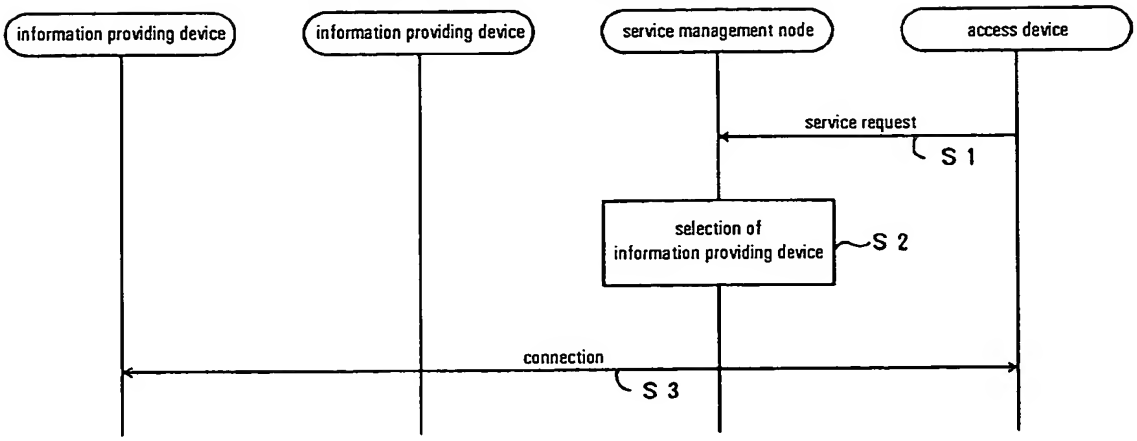


FIG. 2

Block diagram of principles of the invention

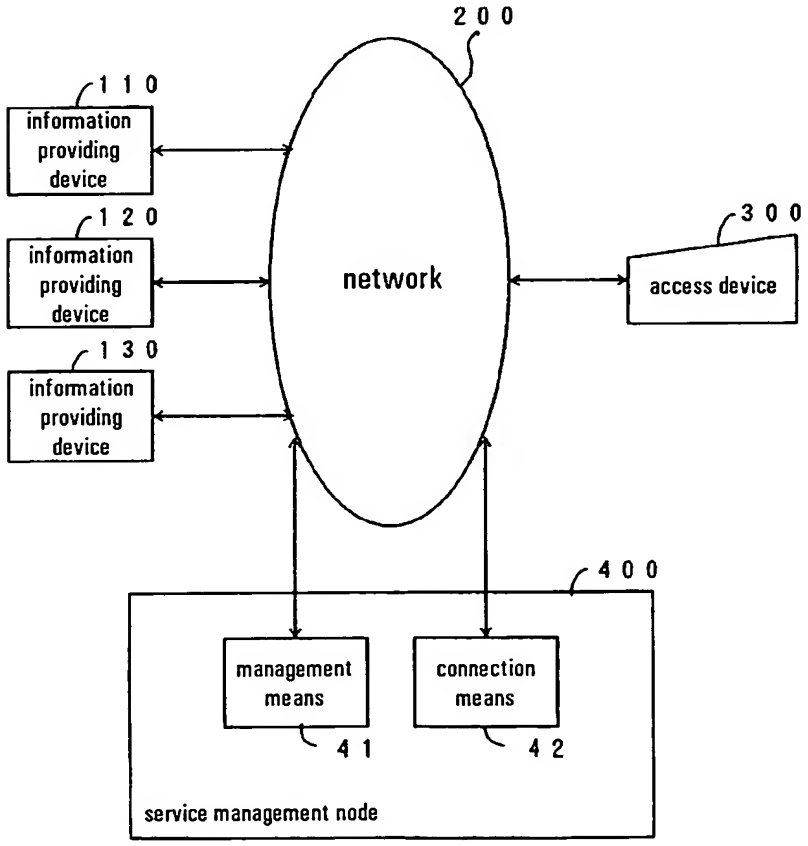


FIG. 3

System block diagram of embodiments of the invention

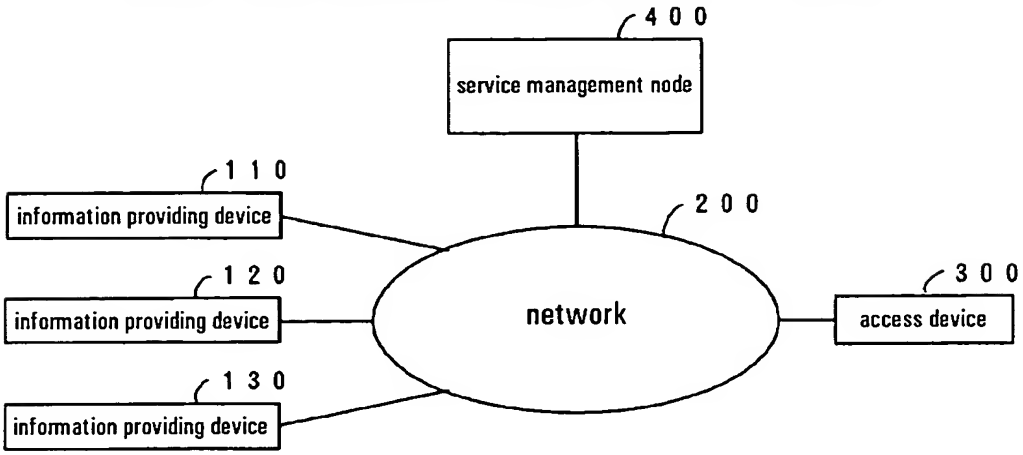


FIG. 4

Constitution of service management node according to an embodiment of the invention

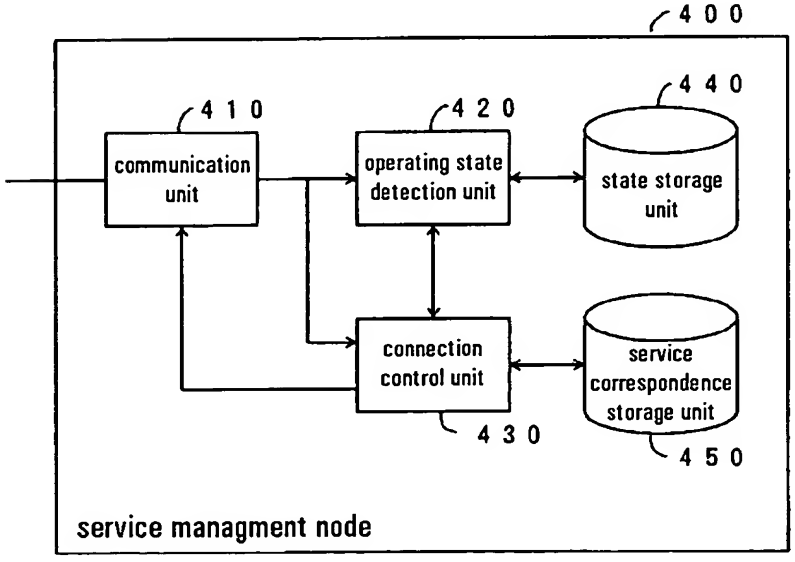


FIG. 5

Examples of information held in state storage unit of an embodiment of the invention

440

(A)

information providing device name	state	address
HE 1	service possible	add 1
HE 2	service possible	add 2
HE 3	service possible	add 3

(B)

information providing device name	state	address
HE 1	service possible	add 1
HE 2	congested	add 2
HE 3	fault	add 3

FIG. 6

Example of information held in service correspondence storage unit of an embodiment of the invention

450

name of provided service	name of information providing device
Prog 1	HE 1
	HE 2
	HE 3

FIG. 7

Sequence chart of operation of an embodiment of the invention

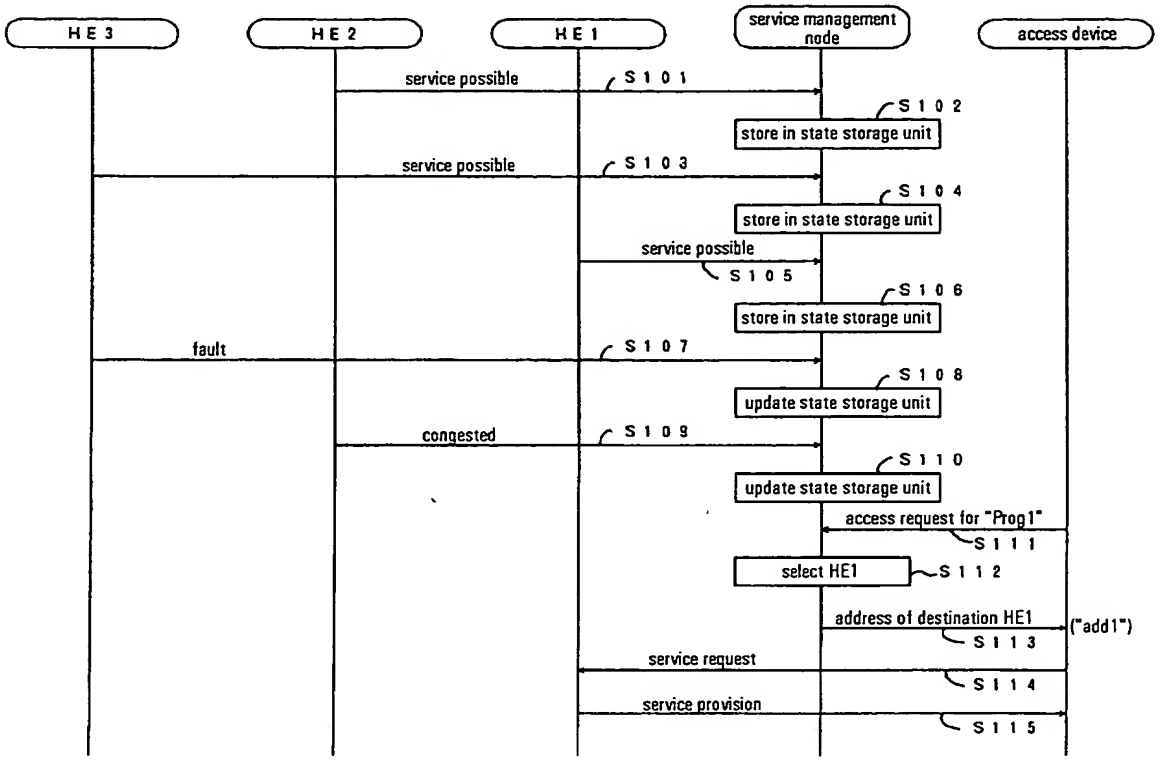


FIG. 8

Sequence chart of operation of another embodiment of the invention

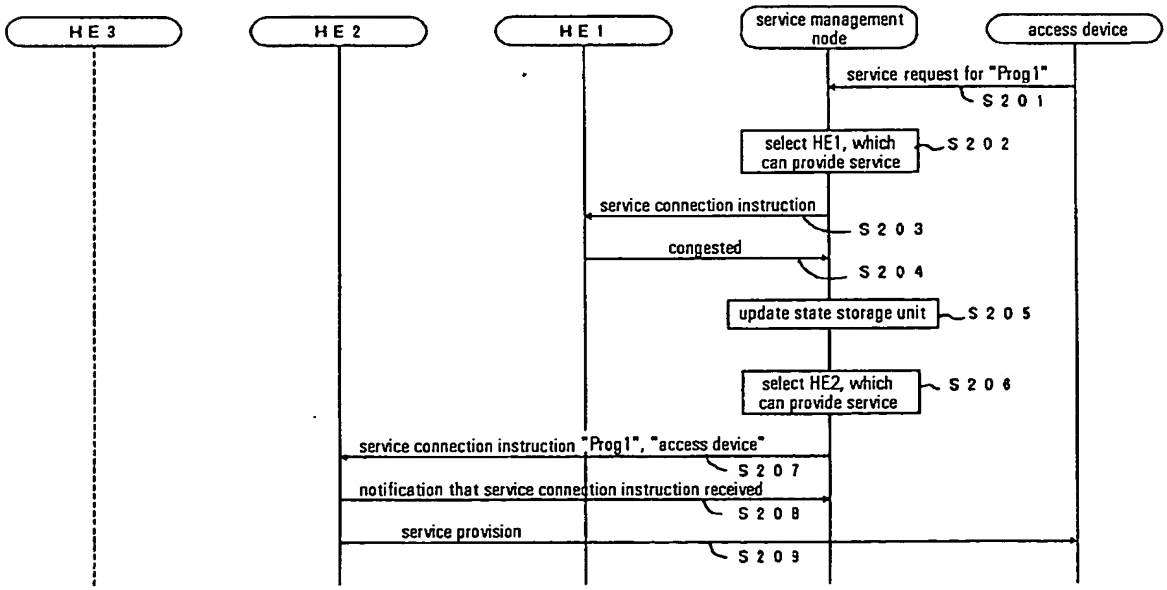


FIG. 9

Examples of information held in state storage unit in another embodiment of the invention

440

(A)

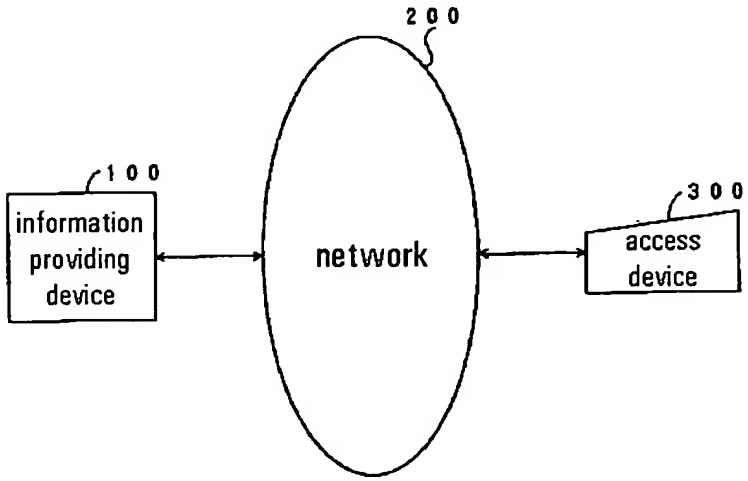
information providing device name	state	address
HE 1	service possible	add 1
HE 2	service possible	add 2
HE 3	fault	add 3

(B)

information providing device name	state	address
HE 1	congested	add 1
HE 2	service possible	add 2
HE 3	fault	add 3

FIG. 10

Constitution of conventional multimedia service system



TRANSLATOR'S NOTES

1. Sic. The writer presumably means either "network addresses ***corresponding to*** each identifier", or "network addresses ***of each information providing device***".
2. In the phrase "said state being detected by said operating state detection means" I have added the words "said state being detected" to clarify the presumable meaning of the Japanese, which reads simply "by said operating state detection means".
3. Sic. See Note 1 above.
4. The Japanese description in this last part of the sentence is defective, and I have added the words in square brackets to make sense of the statement. This paragraph parallels Claim 5.
5. Sic. I am not clear what this "designation instruction" is.
6. Although the examples presented in this specification never show more than one service (and the Japanese text does not distinguish between singular and plural), I am presuming that the invention encompasses cases where a variety of services are provided by the information providing devices.